COMPOSITION OF THE BEVERLY CARIBOU HERD IN THE FALL OF 1980

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D.C. HEARD

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ABSTRACT

The objective of this work was to determine the sex ratio and calf to female ratio in the Beverly caribou herd in October 1980. Of the 1,580 caribou over one year old classified from the ground, 56.7% were female - slightly less than observed during the last classification count conducted in 1978. From the ratio of 51 calves per 100 females, I estimated that 72% of the calves born in June 1980 were still alive during these counts. This calf to female ratio is identical to the mean value observed in other populations in other years but greater than observed in the Beverly herd in 1978. The number of caribou estimated on the 1980 calving ground was extrapolated to a total pre-calving herd estimate of 97,000 caribou.

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INTRODUCTION

The size of the Beverly barren-ground caribou (Rangifer tarandus groenlandicus) population (Bergerud 1978) is extrapolated from an estimate of the number of breeding females on the calving ground (Heard 1980). This calculation requires an estimate of the herd's sex ratio. Sex ratio is best determined during the rut in mid-October when both sexes are most likely to be together in representative proportions.

The number of breeding females on the Beverly herd's calving ground dropped from around 68,000 in 1971 (Heard and Decker 1980) to about 31,000 in 1980 (Gunn and Decker 1982). A major contributing factor to the decline was excessive hunting, most notably the killing of over 14,000 caribou in northern Saskatchewan during the winter of 1979/80 (Caribou Management Group 1980). Although no data were available, Saskatchewan biologists felt that the 1979/80 kill was biased toward females (Kowall pers. comm.). If they were correct, the decline may accelerate.

The size of the Beverly herd could be increased if wolf numbers were reduced (Caribou Technical Committee 1979). An expected effect of wolf control would be an increase in calf survival. The effect of wolf control could be tested by comparing calf survival before and after control.

The objectives of this project were therefore:

1. To determine tne sex ratio so that size of the Beverly herd in 1980 could be estimated and compared (one-tailed test) with herd composition in 1978; and

2. To estimate over-summer calf survival in a herd where wolves have not been controlled.

METHODS

On 21 and 22 October 1980, I flew in a Cessna 337 aircraft with 3 observers to find large groups of Beverly herd caribou which were accessible by helicopter from Stony Rapids, Saskatchewan. There were 5 days between the end of reconnaissance and 5 November 1980 when the weather was suitable for flying. On those days, myself and Cam Elliott (and on 3 Novemver, Ed Kowall) flew from Stony Rapids to areas of caribou concentration in a Bell 206 helicopter. Within those areas I chose sampling locations where the number of caribou and the rate and predictability of their movements would maximize sample size.

From observation points on the ground we identified the sex and age of each caribou as the animals moved past. Unless the penis was visible, sex identification was based on the presence or absence of a vulva. Age categories were calves, yearlings, adult cows, mature bulls and young bulls. Calves were distinguished by their small body size and rounded skull profile. Yearlings were larger animals with a straight skull profile. Young bulls were males carrying antlers less than 90 cm long.

When necessary, caribou were viewed through binoculars or a 20 or 25 power spotting scope. Results were recorded in a notebook or on cassette tape.

Because daily sample sizes differed by more than one order of magnitude, I computed estimates as weighted means and estimated variances after Snedecor and Cochrane (1967) and Heard and Decker (1980).

RESULTS

Distribution and Movements

On 21 and 22 October, we observed caribou concentrations moving south and southwest at both Boyd and Firedrake Lakes. I estimated that there were no more than 15,000 caribou within the area we searched: 103^{o} - 107^{o} W Longitude x 60^{o} 30' N Latitude. The majority of the herd must have been elsewhere. Caribou, presumably from the Boyd Lake group, had reached Flett Lake by 3 November and were heading southwest. The caribou from Firedrake Lake were also moving southwest along a broad front between Burstall and Ivanhoe Lakes on 4 November. Both groups were moving at an average direct line rate of 11 km/day.

Herd Composition

We classified over 2,000 caribou during 5 days between 26 October and 4 November (Table 1). I assumed that the sex ratio of the 58 unsexed yearlings was the same as the 155 which were classified. Thus 100 of the 213 yearlings were believed to be males. Of the 1,580 caribou over one year old, 56.7% were female (783+113/1580). Of the 584 adult bulls 323 (55%) were mature. There were 51 calves per 100 females over one year old and 27 yearlings per 100 cows. The survival of calves from birth until the end of October was 72% assuming an initial calf production of 69 calves per 100 females (Parker 1972) and female survival from June of 98% (51 x 98/69). Survival of the 1979 calf cohort, the 1980 yearlings, was 33% assuming an initial production of 69

Table 1. Composition of the Beverly caribou herd in fall 1980.

Date	Location	Cows	Calves	Bulls	Yearlings			Total
					males	females	unknown	
26 Oct.	Coventry L.	16	9	8	1	1	2	37
29 Oct.	Labyrinth L.	164	106	137	11	11	12	441
31 Oct.	Selwyn L.	239	145	211	31	22	21	669
3 Nov.	Flett L.	308	177	189	22	34	23	753
4 Nov.	Moss L.	56	17	39	8	14	0	134
Total		783	454	584	73	82	58	2034

calves per 100 females and 85% survival of those 100 females from June 1979 until October 1980 (27x85/69). Female survival rates to 4 and 16 months have no supporting data. They are based only on my personal feelings for caribou demography.

Behaviour

The peak of the rut was expected to be between 16 and 26 October assuming that the peak of calving is between 2 and 12 June Parker (1972) and a gestation period of 229 days (Bergerud 1975). Our first day on the ground was 26 October and as expected the rutting behaviour was waning. Mature bulls were rarely seen sparring or fighting and were never seen hock rubbing or tending. There were no fights as vigorous as I had seen on the Bathurst herd in mid-October 1978. The first mature bulls to have shed their antlers were seen on 31 October (2% of mature bulls). Antlerless males were more common thereafter, 8% on 3 November and 20% on 4 November.

Predation

We saw only 3 wolves, a single and a pair, and 5 wolf-killed caribou. Both wolves and kill sites were within the areas of densest caribou concentrations.

DISCUSSION

Distribution and Movements

In 1980, caribou migrated along the same routes as in 1978 and 1979 but they were about 2 weeks and 180 km behind their 1978 schedule and about 3 weeks and 270 km behind 1979 (R. Decker pers. comm.). Caribou reached the N.W.T.- Saskatchewan border by the third week in October 1978 (Heard and Decker 1980), by mid-October 1979 (Kowall pers. comm.) and by 5 November 1980.

The Beverly herd apparently remained further north throughout the summer than in previous years. The herd is usually near Lynx Lake in late August (Hunnisette pers. comm.) but in 1980 the caribou were at Dubawnt Lake 200 km to the northeast (unconfirmed pilot report).

When I was in the field in August 1980, they did not appear to have passed Lynx Lake or the Talston River as stated by Cooper (1981).

Classification Counts

The sex ratio observed in 1980 (76 bulls per 100 cows) was similar to the 1978 estimate of 70 bulls per 100 cows (Heard and Decker 1980). The change in sex ratio was in the expected direction but the difference between years was not significant ($t=0.66$, $df=11$, one-tailed test, $p>.1$). These data provide weak support for the suggestion that the 1979/80 hunter kill was biased slightly toward females. Using the 1980 sex ratio, the 1980 calving ground census (Gunn and Decker 1982) was extrapolated to a total herd population estimate of 97,000.

The 1980 calf: 1^{+} year old female ratio of 51 per 100 was identical to the mean value in other populations in other years (Table 2). The low October 1978 calf counts (30 calves per 100 cows) reflect the unusually high calf mortality on the calving ground (Heard and Decker 1980). If 72% summer calf survival is average, then the majority (over 60%) of calf mortality must occur between October and April when only 25-33% of the calves are still alive. The survival of caribou from birth to 16 months appears to be better in the Beverly herd than in most herds (Table 2).

Fewer caribou were classified in 1980 than in 1978 but the 1980 results are reliable. We sampled different segments of the herd on different days and the results were relatively consistent (Table 3). The coefficient of variation of the sex ratio estimates was only 5% (2.9/56.7). Herd composition did not change with time even though the rut was mostly over by 4 November. Daily sample sizes were a function of caribou behaviour rather than group size. We were able to classify more animals when loose aggregations walked by quickly and continuously. Caribou in dense groups were difficult to classify. As always, yearlings could not be distinguished reliably in October and these results are not reliable.

Table 2. Fall calf and yearling ratios from selected caribou herds.

Herd	Calves:100 1^{+} year old females	Yearlings:100 cows	Source
Beverly 1980	51	27	This study
Beverly 1978	30	28	Heard and Decker 1980
Kaminuriak 1977	63	17	Heard 1980
Bathurst 1977	62	20	Heard field notes
Bathurst 1978	40	19	Heard field notes
Porcupine 1977	48	31	Davis 1978
Western Arctic 1961-78	43	20	Davis et al. 1980
Mean	51	23	

Table 3. Variation in classification counts among areas, Beverly caribou herd, fall 1980.

Sampling Location	Sampling Size	Bulls:100 1+ year old Females	Calves:100 1+ year old Females	Yearlings: 100 Cows
Coventry Lake	37	56	50	44
Labyrinth Lake	441	85	59	21
Selwyn Lake	669	93	53	31
Flett Lake	753	62	50	26
Moss Lake	134	67	24	39
Weighted Mean		76	51	27

RECOMMENDATIONS

The success of fall classification counts is related to the accessibility of caribou. Helicopters can go only a relatively short distance before refuelling. It is therefore essential to cache fuel along the traditional caribou migration routes. I was fortunate this year in being able to buy fuel cached by Polar Gas. Many hours were spent commuting from Stony Rapids. This was expensive and used up precious hours of daylight. Future work should be done out of a well equipped field camp such as the one at Forestry Lake.

If money is allocated for periodic, not just initial, fixed-wing reconnaissance flights, the quality of the results would be increased. Larger samples could be obtained and more importantly, a wider variety of locations could be sampled.

Classification counts should commence by 16 October to be sure of classifying animals during the peak of the rut. One cannot rely on caribou being evenly mixed once the rut is over.

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PERSONAL COMMUNICATIONS

Decker, Robert, Arctic Land Use Research Technician, Department of Renewable Resources, Yellowknife, Northwest Territories.

Hunnisette, Gary, Biologist, Renewable Resources Training Program, Fort Smith, Northwest Territories.

Kowall, Ed, Biologist, Department of Northern Saskatchewan, Prince Albert, Saskatchewan.

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